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GB 2199972 A GB 2193359 A GB 2190525 A
GB 2016770 A GB 1505828 A

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UK CL (Edition J) G4H HNEA HNEB HNEC HNED HNEE HNEF HNEG HNEH HNEL HNEM HNHE
INT CL[4] G08B

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(54) Locating system

(57) An alarm system for monitoring alarm conditions, such as personal attacks, within an area, uses portable transmitters 4 and fixed relays 2. The relays 2 are at different predetermined positions within the area and are connected by wireless, or wire, links to a central control 5. The transmitters 4 are individually coded so that when a transmitter is actuated an identifying code signal is transmitted to the relays 2. Each relay 2 stores any such signal it receives and its time of arrival. The central control 5 interrogates the relays 2 in turn to obtain this information, from which it deduces the location of the actuated transmitter 4 which it displays 7 with the transmitter identity.

Alternatively, the relays 2 may pass signals to the central control 5 on receipt.

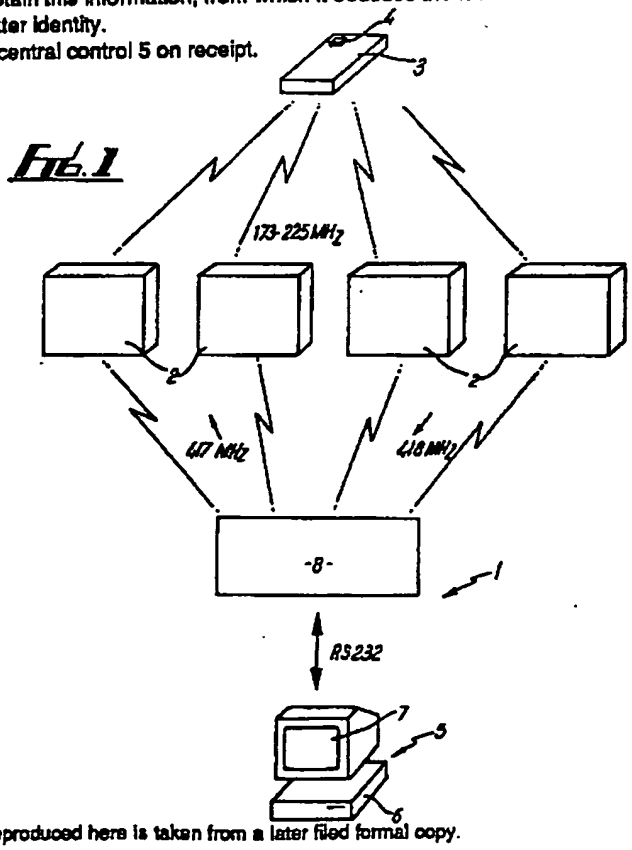

Fig.1

GB 2 229 302 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

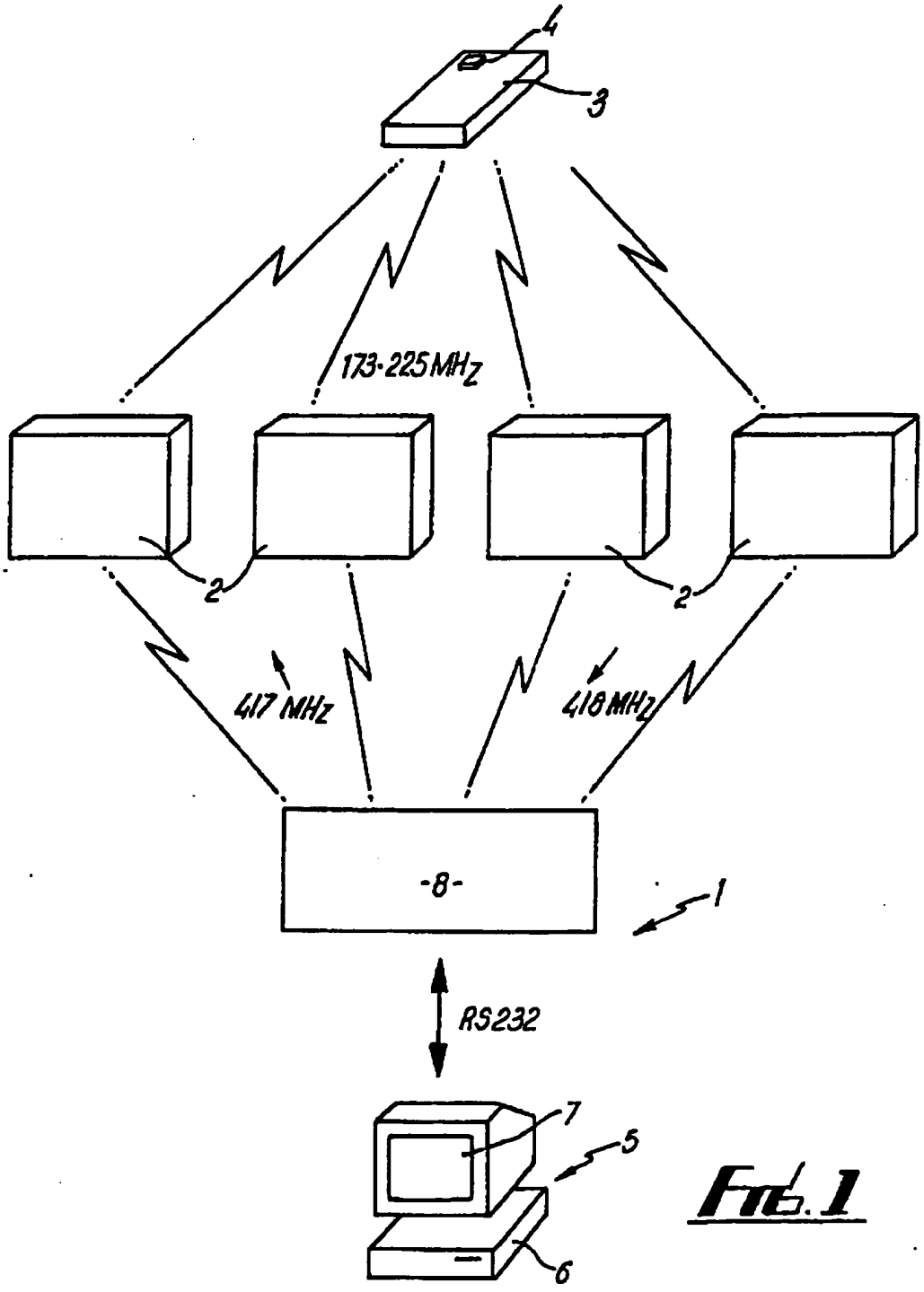

FIG. 1

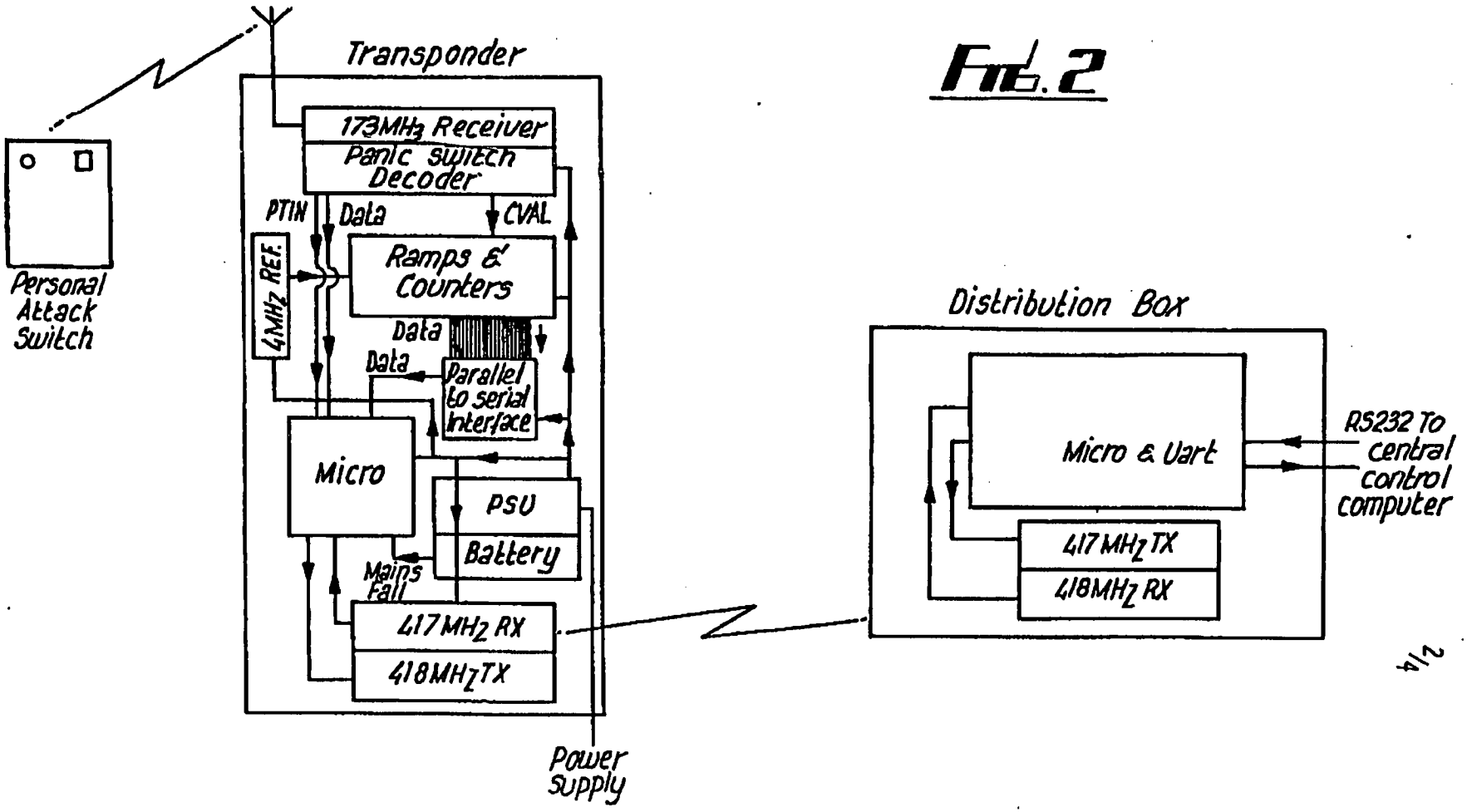
Transponder
173MHz Receiver
Panic switch Decoder
PTIN
Data
CVAL
4MHz REF.
Ramps & Counters
Data
Data
Parallel to serial interface
Micro
PSU
Battery
Mains Fail
417MHz RX
418MHz TX
Personal Attack Switch
Power Supply
Distribution Box
Micro & Uart
417MHz TX
418MHz RX
RS232 To central control computer

FIG. 2

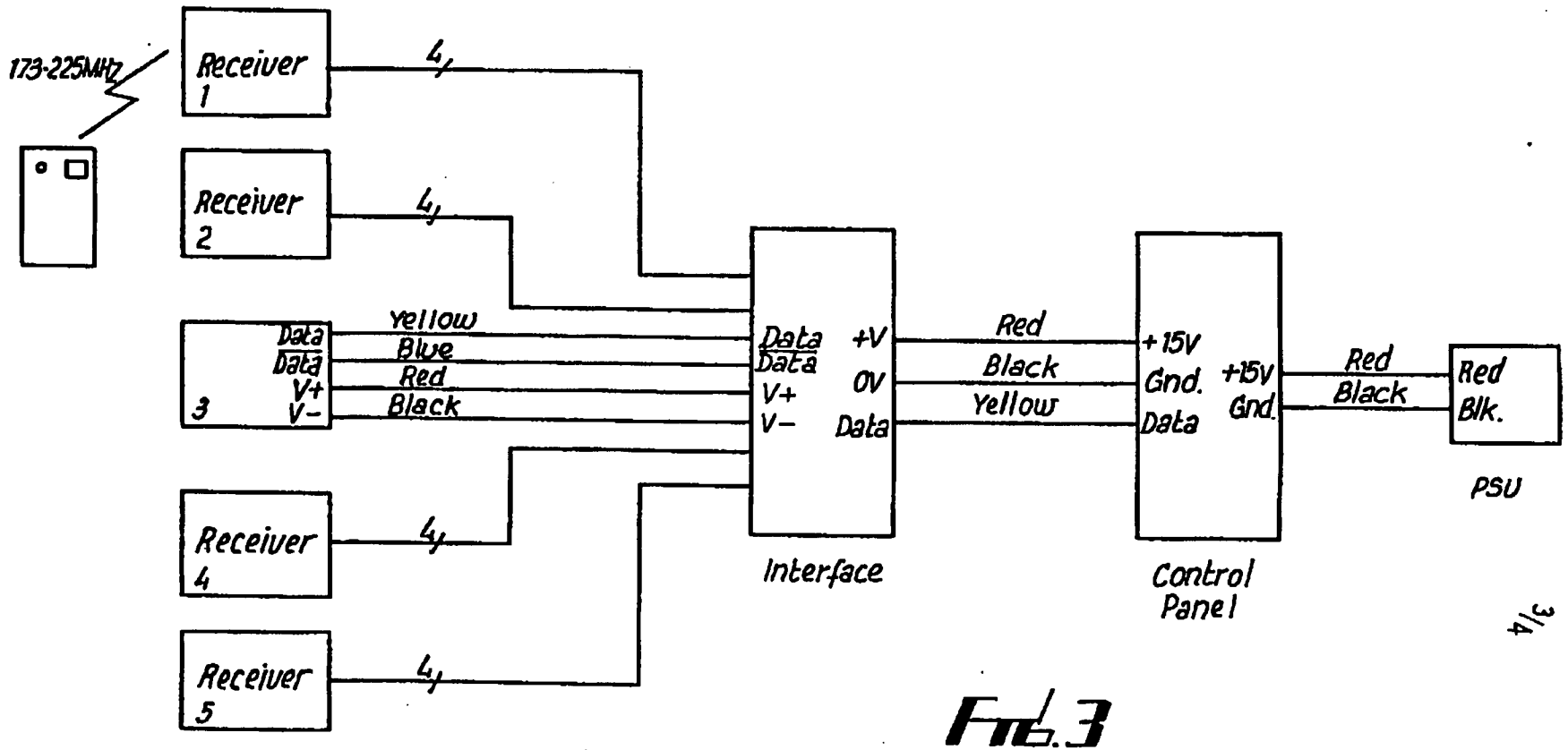
173-225MHz
Receiver 1
Receiver 2
Receiver 3
Receiver 4
Receiver 5
4
Data
Data
V+
V-
Yellow
Blue
Red
Black
Data
Data
V+
V-
+V
0V
Data
Interface
Red
Black
Yellow
+15V
Gnd.
Data
+15V
Gnd.
Control Panel
Red
Black
Red
Blk.
PSU

FIG. 3

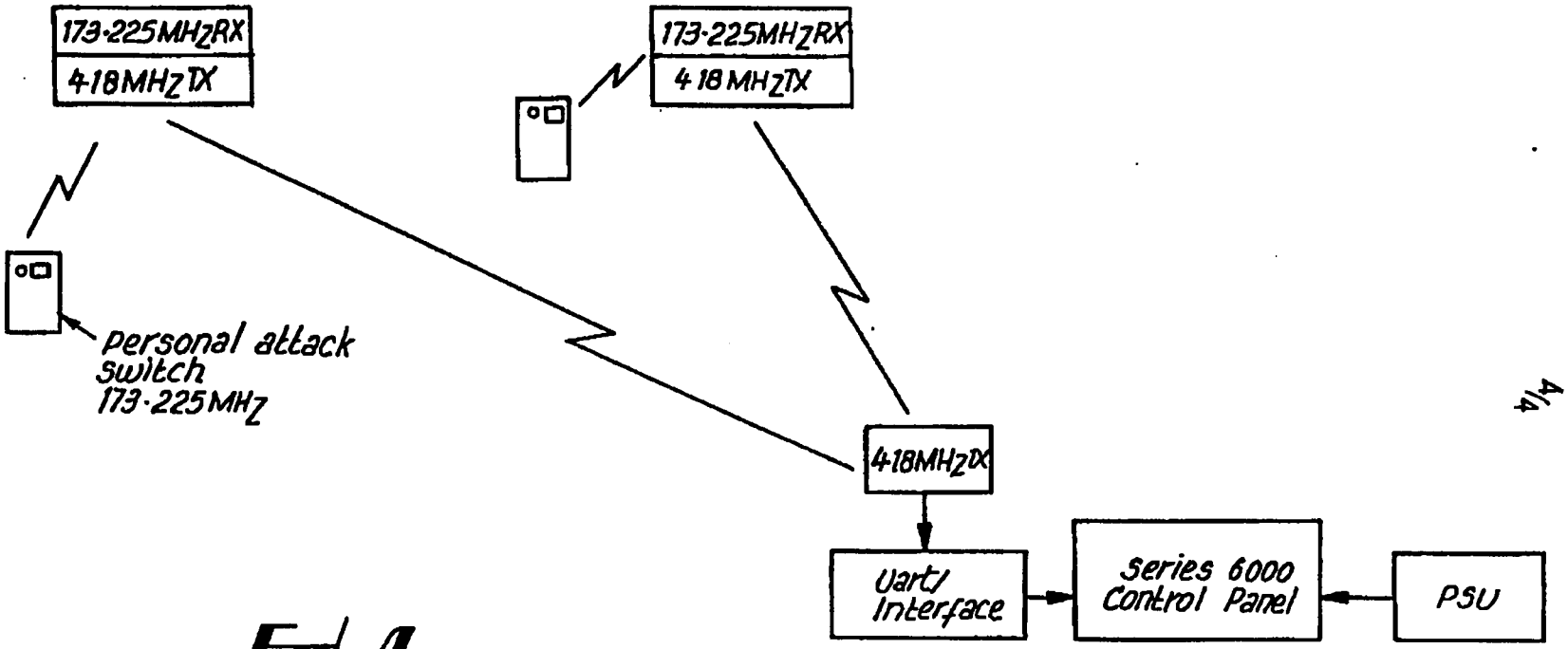
173-225MHZRX
418MHZTX
173-225MHZRX
418MHZTX
personal attack
switch
173-225MHZ
418MHZTX
Uart/
Interface
Series 6000
Control Panel
PSU

FIG. 4

LOCATING SYSTEM

This invention relates to a locating system to provide locating information within an area.

In the case of large establishments or working areas, such as hospitals, industrial plants or the like, the need may arise for personnel to contact a central control station for example to call for assistance in an emergency. This can be done with telephones provided at fixed positions throughout the establishment or working area but this is not wholly satisfactory having regard to the inconvenience and time involved in finding the nearest telephone. It is also possible to provide personnel with portable speech communications equipment but this may be unduly expensive, possibly unreliable and also may be inconvenient and time consuming in so far as it is necessary for a person to transmit to the central control station a verbal identification of his location.

An object of the present invention is to provide a simple, inexpensive locating system by means of which locating information can be transmitted quickly and conveniently to a central control station.

According to the invention therefore there is provided a locating system, to provide locating information within an area, comprising a control device at a central control station, a plurality of portable transmitting devices, and a plurality of fixed relay devices respectively at different positions within the said area, said transmitting devices being operable when actuated to transmit locating signals, said relay devices being operable to relay such signals to the control device, and said control device being operable to produce information identifying the location of an actuated said transmitting device from said relayed

signals.

With this arrangement it is possible to provide locating information in a quick and convenient manner without requiring unduly complicated or expensive equipment.

With regard to the portable transmitting devices, these may comprise personal devices which can be conveniently carried, for example, in a persons pocket. The devices may be activated with a switch, e.g. by pressing a button, or otherwise.

The relay devices may be any suitable devices which conveniently may be mounted on walls or otherwise at spaced positions within the monitored area.

With regard to the central control device, this may comprise a receiving device, for receiving signals from all relay devices, and a single processing device such as a computer for processing the received signals to derive the locating information therefrom. Alternatively, it may be possible to use separate receiving devices at the central control station responsive separately to signals from the different relay devices.

The signal transmitted by each transmitting device may be of any suitable kind. Preferably a signal of short duration electromagnetic radiation is transmitted, particularly at radio frequencies, although other signals such as infra red, light or ultrasonic may be possible. Also, instead of transmitting short duration radiation it may be possible to transmit longer duration radiation with the signal constituting an interruption in or other modification of the radiation. The different transmitting devices may be operable to transmit the same signal. Alternatively the signals may all be different and/or may be of a number

of different groups. In this way it is possible to distinguish between different transmitting devices (e.g. so that persons using the devices can be individually identified), and/or to distinguish between different groups of transmitting devices (e.g. so that the category of persons using the devices can be individually identified). Where the signals are differently coded or distinguished this may be achieved automatically as a function of the construction or pre-setting of the transmitting devices. Alternatively the devices may be operable in different modes or with different control switches or the like so that the user can selectively transmit differently coded or distinguished signals.

The relay devices are preferably arranged to receive signals and relay these to the central control device by means of an electromagnetic radiation (particularly radio) link, although if desired a wire or other link may be used. Each relay device may act simply to receive and pass on the signal. Preferably however the relay device modifies the signal, or generates a different, dependent signal in response thereto, for onward transmission to the control device. Thus, the relay device may demodulate or decode received signals and/or may add further information thereto or substitute further information therefor, particularly information to assist in indentifying the location of the relay device. In the latter respect, the relay devices may incorporate synchronized clocks or counters whereby the control device can be provided with information relating to the respective counts or times of the different counters or clocks when a signal was received from an activated transmitting device. The control device can then utilise differences in the counts or times to calculate the location of the respective transmitting

devices.

Transmission of relayed signals, and any other information signals as mentioned above, from the relay devices to the control device may be effected real time, or in dependence on reception of a signal from an activated transmitting device. Thus, transmission from a relay device to the control device may be triggered on or shortly after the relay devices have received a signal from an activated transmitting device. Alternatively, the arrangement may be such that the relay devices incorporate memory storage and receiving devices and are interrogated in turn by transmissions received from the control devices, signals being stored in the memory storage of the relay devices and being transmitted to the control device only when triggered by the interrogation transmissions.

The control device may be arranged to display data corresponding to signals received from the relay device, for example on a VDU screen or the like. Alternatively or additionally action may be automatically initiated, for example, involving actuation of an audible and/or visual warning device.

The invention will now be described further by way of example only and with reference to the accompanying drawings in which:

Fig. 1 shows a diagrammatic representation of one form of a locating system according to the invention;

Fig. 2 is a more detailed representation of the system of Fig. 1; and

Figs. 3 & 4 are views similar to Fig. 1 of alternative embodiments.

The locating system of Figs. 1 & 2 is for use in a hospital or

other large establishment and comprises a main control device 1 at a central control station, a plurality of relay devices 2 at fixed positions in different zones of the hospital, and a plurality of personal transmitters 3.

Each transmitter 3 is a small, pocket-sized unit comprising a housed battery powered transmitter circuit and an external press button 4. When the button 4 is pressed the transmitter is activated to transmit an RF signal at 173.225 MHz modulated by a binary code (e.g. an 8 bit code). The signal may be transmitted continuously as long as the button 4 is pressed. Alternatively, the arrangement may be such that the signal is transmitted only once for each operation of the press button. Each of the transmitters 4 is pre-set with a unique modulation code which identifies that transmitter.

Each relay device 2 comprises a transmitter/receiver unit which may be mounted on a wall or at some other convenient location. The receiving part of the unit has one receiver which operates at 173.225 MHz to receive coded transmissons from the transmitters 4, and a further receiver which operates at 417 MHz to receive coded transmissions from the control device 1 as described hereinafter. The transmitting part of the unit operates at 418 MHz to transmit information to the control device 1 as described hereinafter.

Each relay device 2 is located within a respective zone of the establishment and has a receiving antenna connected to the first receiving part, for the 173.225 MHz signals, which is principally sensitive to signal transmissions from any transmitter 4 within such zone. The different respective zones are adjacent to each other and cover the

entire area of the establishment in which signal transmissions are to be monitored. Each relay device 2 is however also capable of receiving transmissions from transmitters 4 outside its respective zone. Each device 2 further has a receiving antenna connected to the second receiving part, for receiving the 417 MHz transmissions from the control device 1.

The first receiving part is connected to circuitry including a fast running clock, decoding circuitry and memory storage. The clocks of the respective relay devices 2 run at the same speed and are synchronised in any suitable manner (e.g. by means of a periodically transmitted re-set pulse from the control device 1 or by mains synchronization or otherwise).

The main control device 1 comprises a computer 5 with a central processing unit 6, a VDU screen 7 connected to an interface 8 including a transmitter/receiver. The transmitter part is connected to an antenna and is operable to transmit coded interrogation signals at 418 MHz to be received by the relay devices 2. The receiver part is operable to receive signals from the relay devices 2 and to feed these, via appropriate interface circuitry, to the computer 5.

In use, the transmitter part of the interface 8, under the control of the computer 5, transmits polling or interrogation signals at 417 MHz on a cyclical basis. That is, a first 417 MHz polling signal is transmitted modulated by a unique code (e.g. an 8 bit code) corresponding to a predetermined first one of the relay device 2. Subsequently, successive polling signals are transmitted modulated respectively by different unique codes corresponding respectively to

difference ones of the other relay devices 2. This procedure is repeated continuously, say with a 4 second wait between cycles, giving a total cycle time of 4.5 seconds. The polling signals are received by the relay devices 2 and each relay device 2 is actuated whenever it receives a polling signal coded in accordance with the unique code corresponding to that relay device 2. When actuated, the circuitry within the relay device 2 performs a check to see if any signal has been received from a transmitter 4, and to check that the relay device 2 is correctly operational and not jammed. If no transmitter signal has been received and the device is 'healthy' after a predetermined short time interval a 418 MHz carrier signal modulated with a predetermined 'healthy' code is transmitted by the relay device 2 to the control device 1 where it is decoded and causes the control device 1 to effect transmission of the next polling signal for the next relay device 2.

If the 'healthy' coded signal is not transmitted after the predetermined period of time, this is recognised by the control device and a warning display is produced on the VDU together with an identification of the faulty device 2. The identity of the faulty device is known from the coded polling signal last transmitted by the control device 1.

If there is a 'panic' situation and the button of one of the personal transmitters 4 is pressed, this has the effect of transmitting a 'panic' signal to all of the relay devices 2 coded with the unique code of the activated personal transmitter 4. This coded panic signal is recorded in memory storage in each device 2 and at the same time the instantaneous count of each clock in each device 2 is stored. As each relay device 2

is polled the signal transmitted to the control device 1 is modulated by the code of the activated personal transmitter 4 and by a code specifying the count of the respective clock. The decoded information from all relay devices 2 is processed and the exact location of the activated transmitter 4 is determined by reference to the different clock counts (showing the different times taken for the signal to reach the different devices 2). The VDU 7 then displays the location of the transmitter 4 and the identity of the transmitter 4.

The system can subsequently be re-set by the control device 1 ready for further use.

Fig. 2 shows one relay device 2 and the interface 8 in more detail.

With the arrangement of Figs. 1 & 2 the existence of a panic situation and the location of such situation can be monitored and displayed in an effective and reliable manner with equipment of a relatively simple and inexpensive nature and using portable personal devices which are convenient and quick to operate. The computer 5 may display on the screen 7 a plan of the site together with a visual indication of the location of the activated device 2.

Fig. 3 shows a simplified version in which five zones are monitored with five relay devices 10 connected to an interface 11 by wire links 12. The interface 11 is linked to a control device 13 having a power supply 14.

Portable transmitters 15 are coded to indicate the allocated identity. The control device 13 has a control panel with a display (e.g. a liquid crystal display) which indicates the zone of the activated transmitter.

Also the control device 13 has an audible alarm which is sounded on detection of an activated transmitter.

Fig. 4 shows an arrangement combining features of Figs. 1 & 3. Zones are monitored with relay devices 20 which are connected by wireless links to an interface 21 linked to a control device 22 (with a power supply 23) which is like the control device 13 of Fig. 3.

It is of course to be understood that the invention is not intended to be restricted to the details of the above embodiment which are described by way of example only.

CLAIMS

1. A locating system to provide locating information within an area, comprising a control device at a central control station, a plurality of portable transmitting devices, and a plurality of fixed relay devices respectively at different positions within the said area, said transmitting devices being operable when actuated to transmit locating signals, said relay devices being operable to relay such signals to the control device, and said control device being operable to produce information identifying the location of an actuated said transmitting device from said relayed signals.

2. A system according to claim 1 wherein the portable devices comprise personal devices which can be carried and which are activated with a switch.

3. A system according to claim 1 or 2 wherein the control device comprises a receiving device for receiving signals from all relay devices, and a single processing device for processing received signals to derive the locating information therefrom.

4. A system according to any one of claims 1 to 3 wherein the transmitting device are operable to transmit a short duration electromagnetic signal when actuated.

5. A system according to any one of claims 1 to 4 wherein the transmitting devices are operable to transmit different coded signals.

6. A system according to any one of claims 1 to 5 wherein the relay devices are arranged to receive signals and relay these to the central control device by means of a wireless link.

7. A system according to any one of claims 1 to 6 wherein the relay

devices are arranged to relay to the control device signals which are derived from but different from the signals received from the portable transmitting devices.

8. A system according to claim 7 wherein the relay devices incorporate synchronized clocks or counters whereby the control device is provided with relayed signals representative of the respective counts or times of the different counters or clocks when a signal was received from an activated transmitting device.

9. A system according to any one of claims 1 to 8 wherein transmission from said relay devices to said control device is triggered on or shortly after the relay devices have received a signal from an activated transmitting device.

10. A system according to any one of claims 1 to 8 wherein the relay devices incorporate memory storage and receiving devices and are interrogated in turn by transmissions received from the control devices, signals being stored in the memory storage of the relay devices and being transmitted to the control device only when triggered by the interrogation transmissions.

11. A system according to claim 1 substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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(72) Inventor
William Robert Owen Harris

(74) Agent and/or Address for Service
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(54) Locating system

(57) An alarm system for monitoring alarm conditions, such as personal attacks, within an area, uses portable transmitters 4 and fixed relays 2. The relays 2 are at different predetermined positions within the area and are connected by wireless, or wire, links to a central control 5. The transmitters 4 are individually coded so that when a transmitter is actuated an identifying code signal is transmitted to the relays 2. Each relay 2 stores any such signal it receives and its time of arrival. The central control 5 interrogates the relays 2 in turn to obtain this information, from which it deduces the location of the actuated transmitter 4 which it displays 7 with the transmitter identity.

Alternatively, the relays 2 may pass signals to the central control 5 on receipt.

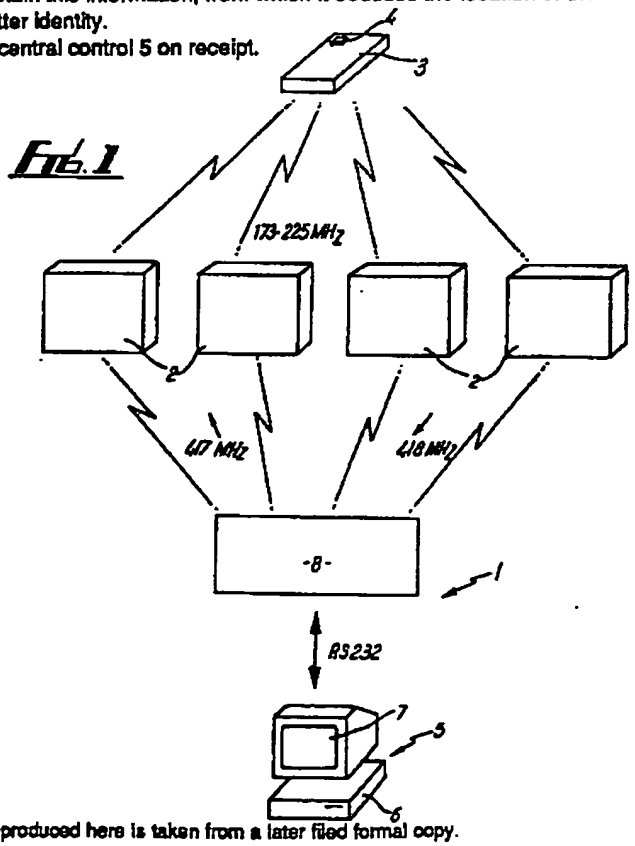

Fig.1

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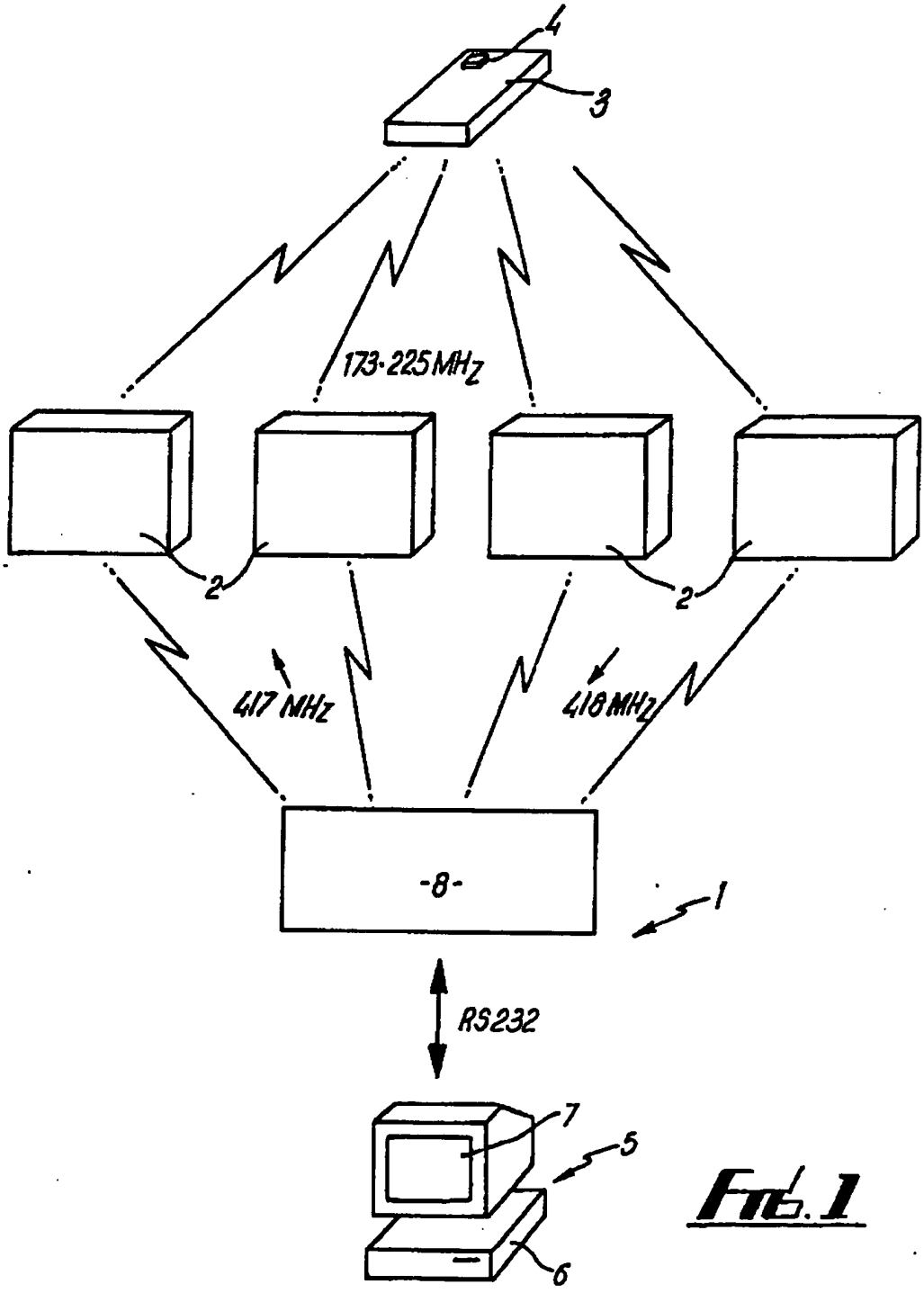
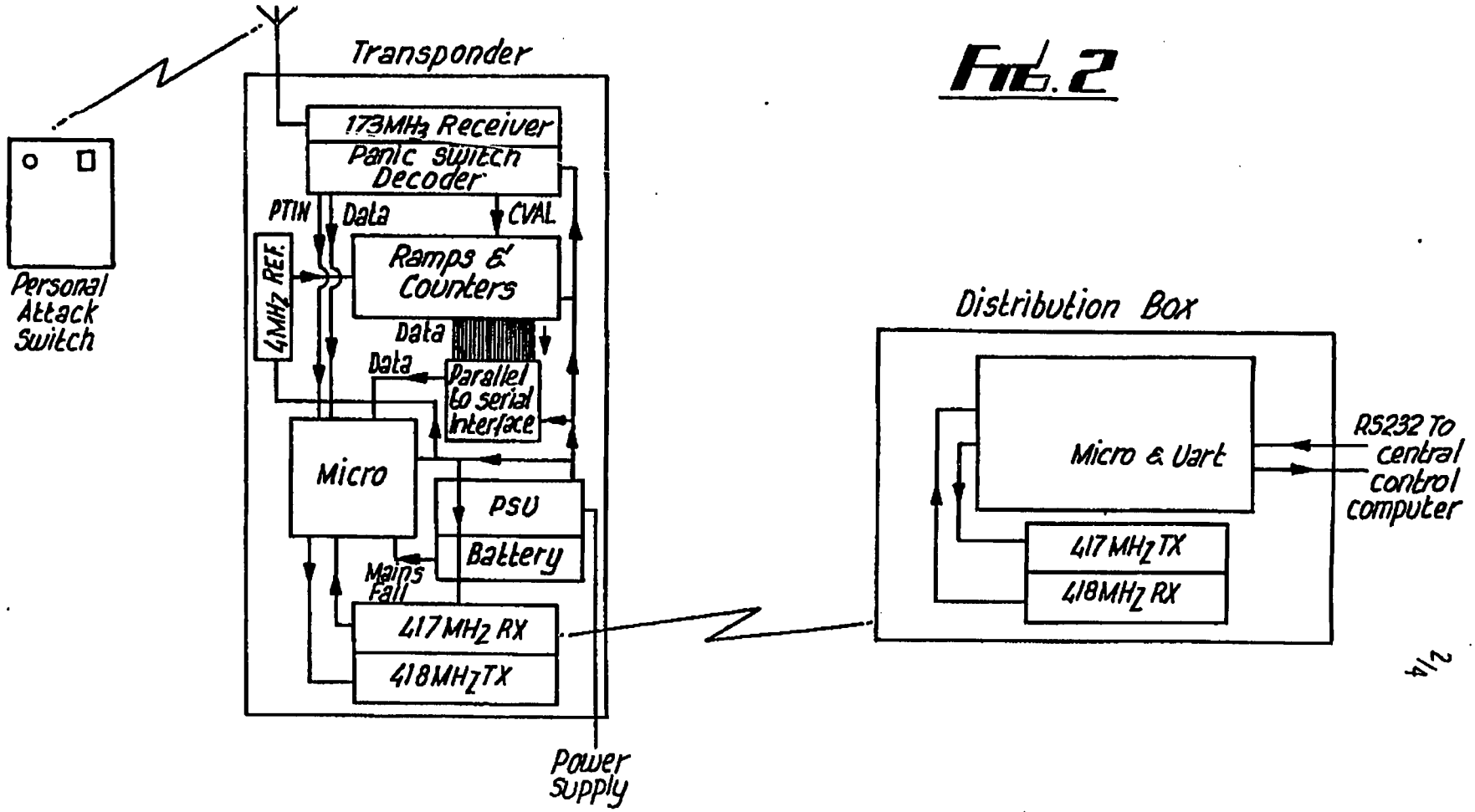


FIG. 1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173MHz Receiver
Panic switch Decoder
PTIN
Data
CVAL
4MHz REF.
Ramps & Counters
Data
Data
Parallel to serial interface
Micro
PSU
Battery
Mains Fail
417MHz RX
418MHz TX
Power supply
Personal Attack Switch
Distribution Box
Micro & Uart
417MHz TX
418MHz RX
RS232 To central control computer

FIG. 2

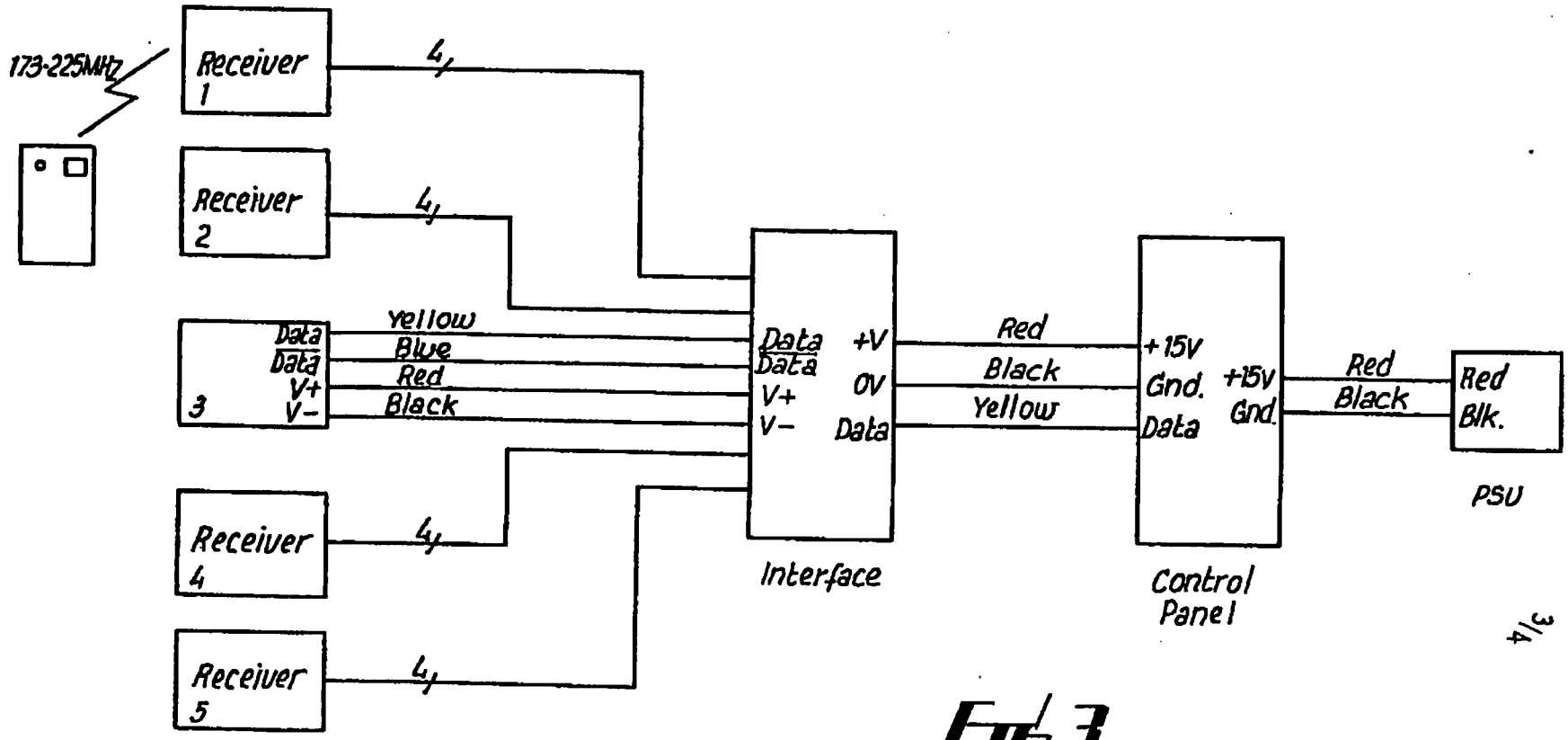
173-225MHz
Receiver 1
Receiver 2
Receiver 3
Receiver 4
Receiver 5
4/
Data
Data
V+
V-
Yellow
Blue
Red
Black
Data
Data
V+
V-
+V
0V
Data
Interface
Red
Black
Yellow
+15V
Gnd.
Data
+15V
Gnd.
Control Panel
Red
Black
Red
Blk.
PSU

FIG. 3

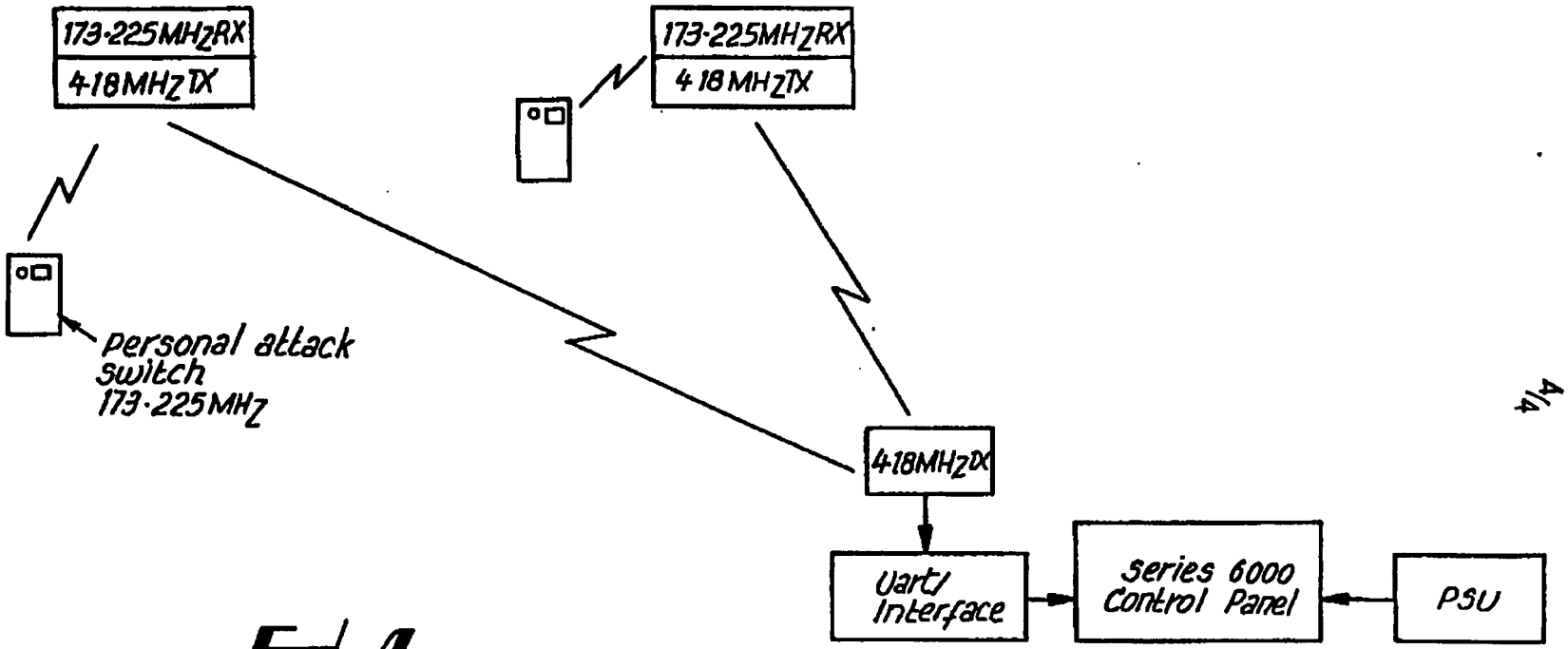
173-225MHzRX
418MHzTX
173-225MHzRX
418MHzTX
personal attack
switch
173-225MHz
418MHzRX
Uart/
Interface
Series 6000
Control Panel
PSU

FIG. 4

LOCATING SYSTEM

This invention relates to a locating system to provide locating information within an area.

In the case of large establishments or working areas, such as hospitals, industrial plants or the like, the need may arise for personnel to contact a central control station for example to call for assistance in an emergency. This can be done with telephones provided at fixed positions throughout the establishment or working area but this is not wholly satisfactory having regard to the inconvenience and time involved in finding the nearest telephone. It is also possible to provide personnel with portable speech communications equipment but this may be unduly expensive, possibly unreliable and also may be inconvenient and time consuming in so far as it is necessary for a person to transmit to the central control station a verbal identification of his location.

An object of the present invention is to provide a simple, inexpensive locating system by means of which locating information can be transmitted quickly and conveniently to a central control station.

According to the invention therefore there is provided a locating system, to provide locating information within an area, comprising a control device at a central control station, a plurality of portable transmitting devices, and a plurality of fixed relay devices respectively at different positions within the said area, said transmitting devices being operable when actuated to transmit locating signals, said relay devices being operable to relay such signals to the control device, and said control device being operable to produce information identifying the location of an actuated said transmitting device from said relayed

signals.

With this arrangement it is possible to provide locating information in a quick and convenient manner without requiring unduly complicated or expensive equipment.

With regard to the portable transmitting devices, these may comprise personal devices which can be conveniently carried, for example, in a persons pocket. The devices may be activated with a switch, e.g. by pressing a button, or otherwise.

The relay devices may be any suitable devices which conveniently may be mounted on walls or otherwise at spaced positions within the monitored area.

With regard to the central control device, this may comprise a receiving device, for receiving signals from all relay devices, and a single processing device such as a computer for processing the received signals to derive the locating information therefrom. Alternatively, it may be possible to use separate receiving devices at the central control station responsive separately to signals from the different relay devices.

The signal transmitted by each transmitting device may be of any suitable kind. Preferably a signal of short duration electromagnetic radiation is transmitted, particularly at radio frequencies, although other signals such as infra red, light or ultrasonic may be possible. Also, instead of transmitting short duration radiation it may be possible to transmit longer duration radiation with the signal constituting an interruption in or other modification of the radiation. The different transmitting devices may be operable to transmit the same signal. Alternatively the signals may all be different and/or may be of a number

of different groups. In this way it is possible to distinguish between different transmitting devices (e.g. so that persons using the devices can be individually identified), and/or to distinguish between different groups of transmitting devices (e.g. so that the category of persons using the devices can be individually identified). Where the signals are differently coded or distinguished this may be achieved automatically as a function of the construction or pre-setting of the transmitting devices. Alternatively the devices may be operable in different modes or with different control switches or the like so that the user can selectively transmit differently coded or distinguished signals.

The relay devices are preferably arranged to receive signals and relay these to the central control device by means of an electromagnetic radiation (particularly radio) link, although if desired a wire or other link may be used. Each relay device may act simply to receive and pass on the signal. Preferably however the relay device modifies the signal, or generates a different, dependent signal in response thereto, for onward transmission to the control device. Thus, the relay device may demodulate or decode received signals and/or may add further information thereto or substitute further information therefor, particularly information to assist in indentifying the location of the relay device. In the latter respect, the relay devices may incorporate synchronized clocks or counters whereby the control device can be provided with information relating to the respective counts or times of the different counters or clocks when a signal was received from an activated transmitting device. The control device can then utilise differences in the counts or times to calculate the location of the respective transmitting

devices.

Transmission of relayed signals, and any other information signals as mentioned above, from the relay devices to the control device may be effected real time, or in dependence on reception of a signal from an activated transmitting device. Thus, transmission from a relay device to the control device may be triggered on or shortly after the relay devices have received a signal from an activated transmitting device. Alternatively, the arrangement may be such that the relay devices incorporate memory storage and receiving devices and are interrogated in turn by transmissions received from the control devices, signals being stored in the memory storage of the relay devices and being transmitted to the control device only when triggered by the interrogation transmissions.

The control device may be arranged to display data corresponding to signals received from the relay device, for example on a VDU screen or the like. Alternatively or additionally action may be automatically initiated, for example, involving actuation of an audible and/or visual warning device.

The invention will now be described further by way of example only and with reference to the accompanying drawings in which:

Fig. 1 shows a diagrammatic representation of one form of a locating system according to the invention;

Fig. 2 is a more detailed representation of the system of Fig. 1; and

Figs. 3 & 4 are views similar to Fig. 1 of alternative embodiments.

The locating system of Figs. 1 & 2 is for use in a hospital or

other large establishment and comprises a main control device 1 at a central control station, a plurality of relay devices 2 at fixed positions in different zones of the hospital, and a plurality of personal transmitters 3.

Each transmitter 3 is a small, pocket-sized unit comprising a housed battery powered transmitter circuit and an external press button 4. When the button 4 is pressed the transmitter is activated to transmit an RF signal at 173.225 MHz modulated by a binary code (e.g. an 8 bit code). The signal may be transmitted continuously as long as the button 4 is pressed. Alternatively, the arrangement may be such that the signal is transmitted only once for each operation of the press button. Each of the transmitters 4 is pre-set with a unique modulation code which identifies that transmitter.

Each relay device 2 comprises a transmitter/receiver unit which may be mounted on a wall or at some other convenient location. The receiving part of the unit has one receiver which operates at 173.225 MHz to receive coded transmissons from the transmitters 4, and a further receiver which operates at 417 MHz to receive coded transmissions from the control device 1 as described hereinafter. The transmitting part of the unit operates at 418 MHz to transmit information to the control device 1 as described hereinafter.

Each relay device 2 is located within a respective zone of the establishment and has a receiving antenna connected to the first receiving part, for the 173.225 MHz signals, which is principally sensitive to signal transmissions from any transmitter 4 within such zone. The different respective zones are adjacent to each other and cover the

entire area of the establishment in which signal transmissions are to be monitored. Each relay device 2 is however also capable of receiving transmissions from transmitters 4 outside its respective zone. Each device 2 further has a receiving antenna connected to the second receiving part, for receiving the 417 MHz transmissions from the control device 1.

The first receiving part is connected to circuitry including a fast running clock, decoding circuitry and memory storage. The clocks of the respective relay devices 2 run at the same speed and are synchronised in any suitable manner (e.g. by means of a periodically transmitted re-set pulse from the control device 1 or by mains synchronization or otherwise).

The main control device 1 comprises a computer 5 with a central processing unit 6, a VDU screen 7 connected to an interface 8 including a transmitter/receiver. The transmitter part is connected to an antenna and is operable to transmit coded interrogation signals at 418 MHz to be received by the relay devices 2. The receiver part is operable to receive signals from the relay devices 2 and to feed these, via appropriate interface circuitry, to the computer 5.

In use, the transmitter part of the interface 8, under the control of the computer 5, transmits polling or interrogation signals at 417 MHz on a cyclical basis. That is, a first 417 MHz polling signal is transmitted modulated by a unique code (e.g. an 8 bit code) corresponding to a predetermined first one of the relay device 2. Subsequently, successive polling signals are transmitted modulated respectively by different unique codes corresponding respectively to

difference ones of the other relay devices 2. This procedure is repeated continuously, say with a 4 second wait between cycles, giving a total cycle time of 4.5 seconds. The polling signals are received by the relay devices 2 and each relay device 2 is actuated whenever it receives a polling signal coded in accordance with the unique code corresponding to that relay device 2. When actuated, the circuitry within the relay device 2 performs a check to see if any signal has been received from a transmitter 4, and to check that the relay device 2 is correctly operational and not jammed. If no transmitter signal has been received and the device is 'healthy' after a predetermined short time interval a 418 MHz carrier signal modulated with a predetermined 'healthy' code is transmitted by the relay device 2 to the control device 1 where it is decoded and causes the control device 1 to effect transmission of the next polling signal for the next relay device 2.

If the 'healthy' coded signal is not transmitted after the predetermined period of time, this is recognised by the control device and a warning display is produced on the VDU together with an identification of the faulty device 2. The identity of the faulty device is known from the coded polling signal last transmitted by the control device 1.

If there is a 'panic' situation and the button of one of the personal transmitters 4 is pressed, this has the effect of transmitting a 'panic' signal to all of the relay devices 2 coded with the unique code of the activated personal transmitter 4. This coded panic signal is recorded in memory storage in each device 2 and at the same time the instantaneous count of each clock in each device 2 is stored. As each relay device 2

is polled the signal transmitted to the control device 1 is modulated by the code of the activated personal transmitter 4 and by a code specifying the count of the respective clock. The decoded information from all relay devices 2 is processed and the exact location of the activated transmitter 4 is determined by reference to the different clock counts (showing the different times taken for the signal to reach the different devices 2). The VDU 7 then displays the location of the transmitter 4 and the identity of the transmitter 4.

The system can subsequently be re-set by the control device 1 ready for further use.

Fig. 2 shows one relay device 2 and the interface 8 in more detail.

With the arrangement of Figs. 1 & 2 the existence of a panic situation and the location of such situation can be monitored and displayed in an effective and reliable manner with equipment of a relatively simple and inexpensive nature and using portable personal devices which are convenient and quick to operate. The computer 5 may display on the screen 7 a plan of the site together with a visual indication of the location of the activated device 2.

Fig. 3 shows a simplified version in which five zones are monitored with five relay devices 10 connected to an interface 11 by wire links 12. The interface 11 is linked to a control device 13 having a power supply 14.

Portable transmitters 15 are coded to indicate the allocated identity. The control device 13 has a control panel with a display (e.g. a liquid crystal display) which indicates the zone of the activated transmitter.

Also the control device 13 has an audible alarm which is sounded on detection of an activated transmitter.

Fig. 4 shows an arrangement combining features of Figs. 1 & 3. Zones are monitored with relay devices 20 which are connected by wireless links to an interface 21 linked to a control device 22 (with a power supply 23) which is like the control device 13 of Fig. 3.

It is of course to be understood that the invention is not intended to be restricted to the details of the above embodiment which are described by way of example only.

CLAIMS

1. A locating system to provide locating information within an area, comprising a control device at a central control station, a plurality of portable transmitting devices, and a plurality of fixed relay devices respectively at different positions within the said area, said transmitting devices being operable when actuated to transmit locating signals, said relay devices being operable to relay such signals to the control device, and said control device being operable to produce information identifying the location of an actuated said transmitting device from said relayed signals.

2. A system according to claim 1 wherein the portable devices comprise personal devices which can be carried and which are activated with a switch.

3. A system according to claim 1 or 2 wherein the control device comprises a receiving device for receiving signals from all relay devices, and a single processing device for processing received signals to derive the locating information therefrom.

4. A system according to any one of claims 1 to 3 wherein the transmitting device are operable to transmit a short duration electromagnetic signal when actuated.

5. A system according to any one of claims 1 to 4 wherein the transmitting devices are operable to transmit different coded signals.

6. A system according to any one of claims 1 to 5 wherein the relay devices are arranged to receive signals and relay these to the central control device by means of a wireless link.

7. A system according to any one of claims 1 to 6 wherein the relay

devices are arranged to relay to the control device signals which are derived from but different from the signals received from the portable transmitting devices.

8. A system according to claim 7 wherein the relay devices incorporate synchronized clocks or counters whereby the control device is provided with relayed signals representative of the respective counts or times of the different counters or clocks when a signal was received from an activated transmitting device.

9. A system according to any one of claims 1 to 8 wherein transmission from said relay devices to said control device is triggered on or shortly after the relay devices have received a signal from an activated transmitting device.

10. A system according to any one of claims 1 to 8 wherein the relay devices incorporate memory storage and receiving devices and are interrogated in turn by transmissions received from the control devices, signals being stored in the memory storage of the relay devices and being transmitted to the control device only when triggered by the interrogation transmissions.

11. A system according to claim 1 substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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